

CANYONLANDS NATIONAL PARK (CANY)**Size 136,610 hectares (337,570 acres)**

Park History and Purpose Efforts to turn Utah's canyon country into a national park began about 1935 when Secretary of the Interior Harold Ickes proposed setting aside 7,000 square miles of southeast Utah as Escalante National Monument. This effort was doomed by opposition from state commercial interests and the demands of World War II (Smith 1991), but with the rise of the conservation movement in the 1960s, Senator Frank Moss, Secretary of the Interior Stewart Udall, and locals such as Kent Frost took up the battle to preserve the "still untouched" canyon country near the confluence of the Green and Colorado Rivers. Their efforts resulted in Congress and President Lyndon B. Johnson setting aside Canyonlands National Park on September 12, 1964. As stated in Public Law 88-590, Canyonlands was established "...to preserve an area in the State of Utah possessing superlative scenic, scientific, and archeological features for the inspiration, benefit, and use of the public..." This is the overriding legal mandate that guides the park's resource management program today.

Location Canyonlands National Park is located in southeast Utah along the Colorado and Green Rivers in Grand, Garfield, San Juan and Wayne Counties. The park is southwest of Moab, Utah, 161 kilometers (100 miles) west of Grand Junction, Colorado, and 386 kilometers (240 miles) southeast of Salt Lake City, Utah. Parts of the park are readily accessible by major travel routes such as Interstate I-70 and Utah Highway 191.

The area surrounding the park is sparsely populated with a density of approximately two people per square mile (0.8 people per square kilometer). Tourism is currently the most important economic activity.

Elevation Elevations range from approximately 1,189 meters (3,900 feet) on the Colorado River south of Cataract Canyon to 2,188 meters (7,180 feet) above Big Pocket in the Needles District.

General Description Canyonlands National Park has been expanded since originally established in 1964 to its present size of 136,610 hectares (337,570 acres) centered around the confluence of the Green and Colorado Rivers. The rivers divide the park into three geographical districts: the Island in the Sky District is the triangle of land between the two rivers, the Needles District lies east of the Colorado River, and the Maze District lies to the west of the Colorado and Green Rivers. The Horseshoe Canyon Detached Unit is managed as part of the Maze District. In addition, the Green and Colorado River corridors are managed as a separate River District.

From prehistoric Native Americans searching for chert outcrops, through the geological investigations of John Wesley Powell and other turn-of-the-century explorers, to uranium miners of the 1950s, the geologic resources of Canyonlands have been of major interest and importance. As a result geological publications are widely available (Baars and Molenaar 1971; Huntoon, Billingsley and Breed 1982; Mutschler 1969) and the park's geological resources are well known.

For visitors, probably the two most important geological features are the uniquely banded red and white sandstone of the Cedar Mesa formation (exposed in the Needles and Maze Districts) and the White Rim Sandstone exposed in the Island in the Sky District.

Incredible features include the remote mesas, buttes, and deep canyons cut by the Green and Colorado Rivers and their tributaries. The park's name, Canyonlands, is derived from the geology term "Canyon Lands," which is defined as the province south of the Uinta Basin and between the High Plateaus on the west and the Rocky Mountains to the east. As explained by Stokes (1988:241), the park lies at the rugged and remote heart of the Canyon Lands section of the Colorado Plateau physiographic province in southeast Utah. The park is characterized by sedimentary rock, which has been deformed by anticlines, synclines and monoclines. Uplift of the Colorado Plateau and concurrent water erosion have produced the extensive, deep canyon systems which are the defining features of the park and physiographic section (Lammers 1991).

There are five major sedimentary formations exposed ranging in age from the Pennsylvanian Paradox formation to the Jurassic Navajo Sandstone. In stratigraphic order, formations include Paradox, Honaker Trail, Cutler Group, Moenkopi, Chinle, Wingate Sandstone, Kayenta, and Navajo Sandstone. The Paradox formation of salt and gypsum evaporates is a highly plastic formation which has formed the salt anticlinal structures and grabens, which collapsed when ground water eroded the salt.

The climate is arid; characterized by hot, dry summers and cool to cold winters. Temperatures vary with altitude and latitude (Brough, Jones and Stevens 1987). In the Needles District at an elevation of 1,536 meters (5,040 feet) the average maximum temperature is 68.3⁰ F, the average minimum is 37.8⁰ F. The average annual precipitation is 219 millimeters (8.62 inches). In the Island in the Sky at an elevation of 1,807 meters (5,930 feet) the average maximum temperature is 64.1⁰ F, and the average minimum temperature was 42.2⁰ F. Temperatures can reach as high as 110⁰ F and as low as -16⁰ F. The normal annual precipitation is 235 millimeters (9.27 inches).

Potential evapotranspiration exceeds precipitation, making effective soil moisture a critical environmental factor. Precipitation peaks occur in March and August. Snow falls between November and March.

Flora Previous research documented strong relationships between edaphic characteristics and the distribution and composition of plant communities. Loope (1977) mapped the distribution of six relatively distinct vegetation types in relation to substrate. These types include (1) shrublands dominated by blackbrush (*Coleogyne ramosissima*) on shallow (<50 cm depth), weakly developed calcareous soils formed from sandstone or sandy shales, (2) shrublands dominated by shadscale (*Atriplex confertifolia*) on shallow soils formed from shales with high clay content, (3) grasslands dominated by needle and thread grass (*Stipa comata*), indian ricegrass (*Stipa hymenoides*), galleta grass (*Hilaria jamesii*), various species of dropseed (*Sporobolus* spp.), and cheatgrass (*Bromus tectorum*) on deep (>50 cm depth) soils where plant roots cannot reach the water table or

capillary zone, (4) shrublands dominated by 4-wing saltbush (*Atriplex canescens*) and sagebrush (*Artemisia tridentata*) on deep sandy soils where roots seasonally access the capillary zone, (5) communities dominated by cottonwood (*Populus fremontii*), willow (*Salix* spp.), tamarisk (*Tamarix ramosissima*) and other shrubs in riparian zones where there is immediate root access to the water table, and (6) sparse woodlands dominated by pinyon (*Pinus edulis*) and juniper (*Juniperus osteosperma*) on lithic soils where water availability is controlled by hydrological effects of bedrock joints and outcrops.

Other plant communities include snakeweed/shadscale/Mormon tea (*Gutierrezia sarothrae*/*Atriplex confertifolia*/*Ephedra viridis*), purple sage/shinnery oak/Utah juniper (*Poliomintha incana*/*Quercus harvardii*/*Juniperus osteosperma*), and greasewood/four-wing saltbush (*Sarcobatus vermiculatus*/*Atriplex canescens*). Springs and seeps are also scattered throughout the park and are generally composed of maidenhair fern/Jones reedgrass (*Adiantum capillus-veneris*/*Calamagrostis scopulorum*).

There are a number of small communities scattered in unique microsites. These include relictual Douglas fir (*Pseudotsuga mensezii*) and aspen (*Populus tremuloides*) sites.

Fauna

Mammals

CANY is extremely important habitat for desert bighorn sheep (*Ovis canadensis nelsonii*). Additional mammals include the western pipistrel (*Pipistrellus hesperus*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), rock squirrel (*Spermophilus variegatus*), Colorado chipmunk (*Eutamias quadrivittatus*), Apache pocket mouse (*Perognathus flavescens*), Ord kangaroo rat (*Dipodomys ordi*), canyon mouse (*Peromyscus crinitus*), deer mouse (*P. maniculatus*), piñon mouse (*P. truei*), northern grasshopper mouse (*Onychomys leucogaster*), desert woodrat (*Neotoma lepida*), porcupine (*Erethizon dorsatum*), blacktailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), mule deer (*Odocoileus hemionus*), striped skunk (*Mephitis mephitis*), ringtail (*Bassariscus astatus*) and badger (*Taxidea taxus*).

Birds

Common bird species are the mourning dove (*Zenaidura macroura*), common nighthawk (*Chordeiles minor*), white-throated swift (*Aeronautes saxatalis*), violet-green swallow (*Tachycineta thalassina*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), scrub jay (*Aphelocoma coerulescens*), common raven (*Corvus corax*), piñon jay (*Gymnorhinus cyanocephalus*), plain titmouse (*Parus inornatus*), cañon wren (*Catherpes mexicanus*), rock wren (*Salpinctes obsoletus*), loggerhead shrike (*Lanius ludovicianus*), gray vireo (*Vireo vicinior*), black-throated gray warbler (*Dendroica nigrescens*), black-throated sparrow (*Amphispiza bilineata*) and dark-eyed junco (*Junco hyemalis*), Cooper's hawk (*Accipiter cooperi*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*) and the northern harrier (*Circus cyaneus*).

Herptofauna

Common herptofauna are the red-spotted toad (*Bufo punctatus*), Woodhouse toad (*B. woodhousei*), collared lizard (*Crotaphytus collaris*), short-horned lizard (*Phrynosoma douglassi*), sagebrush lizard (*Sceloporus graciosus*), eastern fence lizard (*S. undulatus*), tree lizard (*Urosaurus ornatus*), leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), gopher snake (*Pituophis catenifer*), common garter snake (*Pituophis catenifer*) and the midget faded rattlesnake (*Crotalus viridis concolor*).

Aquatic Macroinvertebrates are monitored four times a year, since 1997, as part of the Water Quality Monitoring Program started in 1987. There are four endangered fish in the Colorado and Green Rivers: bonytail chub (*Gila elegans*), humpback chub (*Gila cypha*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*). We also have northern river otter (*Lutra canadensis*) and beaver (*Castor canadensis*).

Unique Features and Species of Special Concern

Plant Communities of Concern Riparian, River, Relict Areas, Seeps, Springs, Hanging Gardens, Douglas fir (*Pseudotsuga menziesii*) relict areas, and Aspen (*Populus tremuloides*) relict areas.

Plants CANY has a number of sensitive plant species but none are Federally classified as Threatened or Endangered. Sensitive endemics include the southwestern cloakfern (*Argyrochosma limitanea* spp. *Limitanea*), large-seeded milkweed (*Asclepias macrosperma*), Rusby milkweed (*Asclepias rusbyi*), bird's nest milkvetch (*Astragalus nidularius*), Fisher milkvetch (*Astragalus piscator*), sandstone milkvetch (*Astragalus sesquiflorus*), Franklin's ceonothus (*Ceonothus greggii* var. *franklinii*), Cateract gilia (*Gilia latifolia* var. *imperialis*), Hutchin's gilia (*Gilia hutchinsonfolia*), rimrock phlox (*Phlox austromontana* var. *lutescens*), alcove bog orchid (*Habanaria zothecina*), Jane's globemallow (*Sphaeralcea janae*), resinbush (*Vanclevia stylosa*), alcove rock daisy (*Perityle specuicola*), entrada rushpink (*Lygodesmia entrada*), helleborine (*Epipactus gigantea*), Howell scorpionweed (*Phacelia howelliana*), Trotter oreoxis (*Oreoxis trotteri*), alcove death camus (*Zigadenus vaginatus*), Osterhout's cryptanth (*Cryptantha osterhoutii*), Utah bladder fern (*Cystopteris utahensis*), wing-seed stickleaf (*Mentzelia pterosperma*), roseate gilia (*Gilia roseata*), Eastwood monkeyflower (*mimulus eastwoodii*), Moab woodyaster (*Xylorhiza glabriuscula* var. *linearifolia*), San Rafael prickly pear (*Argemone corymbosa* ssp. *arenicola*), and Toft's yucca (*Yucca angustissima* var. *toftiae*).

Animals The park has five Federally listed Endangered species, four are fish: Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*) and bonytail chub (*Gila elegans*). The fifth is the southwestern willow flycatcher (*Empidonax trailii extimus*). Surveys just completed observed this species, but no breeding sites were found (Johnson et al.1999).

The bald eagle (*Haliaeetus leucocephalus*) and the American peregrine falcon (*Falco peregrinus anatum*) have recently been delisted. One park species listed as Threatened is

the Mexican spotted owl (*Strix occidentalis lucida*). Extensive inventories reveal a number of breeding Mexican spotted owls (Willey 1998). Some monitoring for peregrine falcons and bald eagles has occurred, but more thorough and regular surveys are needed. The bald eagle uses the park primarily for winter forage. Two other birds of concern are the Western burrowing owl (*Athene cunicularia hypugia*) and the brown-headed cowbird (*Molothrus ater*).

CANY has a number of sensitive bat species including long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysandodes*), and pale Townsend's big-eared bat (*Plecotus townsendii pallesoens*).

The northern river otter (*Lutra canadensis*) is a species of concern.

Amphibians of concern include the northern leopard frog (*Rana pipiens pipiens*), tiger salamander (*Ambystoma tigrinum nebulosum*), western toad (*Bufo boreas*), and the bullfrog (*Rana catesbeiana*). The bullfrog, an exotic, competes successfully with native amphibians.

Resource Management Concerns

Increased recreational use (visitation) and exotic plant species invasion are the main natural resource management concerns. Damage to cultural resources is also a concern.

Recreation Use Visitor use increased rapidly during the 1980s and early 1990s causing soil and vegetation damage in heavily used areas. Impacts from visitors hiking off-trail destroy cryptobiotic soils, tramples vegetation, increases erosion, and effects plant growth.

Land Use Impacts Although uranium mining was one of the most important area economic activities from 1950-1980, it has largely dissipated due to depressed prices and the discovery of more economical sources of uranium-bearing ore in the world. Currently, the significant mineral extraction activities are solution mining of salt and potash at the Texas-Gulf Mine at Potash, Utah north of the park, and exploratory drilling for oil and gas on adjacent BLM lands.

Ambient noise levels are the lowest in the country. The degree of silence one encounters in most areas of CANY is astounding and one of its great resources. Any noise detected may be associated with wildlife activity, backcountry hikers or an occasional aircraft. Increased oil and gas activity and the potential for mining could add significantly to noise levels. Commercial enterprises, such as airplane sightseeing tours, could also have an impact.

Without lights from a nearby metropolitan area and the clearest air in the country, the night sky resources are outstanding. Located on a plateau, one has a nearly 360 degree view of the stars. Numerous visitors, particularly those from the eastern United States or urban areas comment on this resource. Commercial development along highway 191 and development in the Moab Valley have already impacted this resource.

Invasive Exotic Plant Species

CANY has about 60 exotic plants. Tamarisk (*Tamarix ramosissima*) is a problem in riparian areas and along the river. Cheatgrass (*Bromus tectorum*), Russian olive (*Eleagnus angustifolia*), and Russian knapweed (*Centaurea repens*) are also a problem. There is a full time vegetation specialist and progress is being made mapping and eliminating many exotic plant sites.